SESSION: Overview of deterioration mechanism

INSTRUCTOR: John Fidler

TIME: Wednesday, 8th May/10:00-11:00 (1 hour) & 11:30-13:00 (1.5 hours)

SESSION OUTLINE

ABSTRACT
The session will introduce cause and effect in the weathering and deterioration of building stones at both macro- and micro- levels. The presentation and walking tour will create a general awareness of the issues involved and their inter-relationships so that subsequent presentations will elucidate the issues in more detail.

OBJECTIVES
• to be introduced to, and made aware of, the physical symptoms and causes of stone decay and deterioration;
• to gain a general understanding of the structural and architectural causes of damage to stone, stone sculpture, and stone masonry walls and floors;
• to gain a general understanding of the inter-relationship between the inherent physical, chemical and mineralogical sensibilities of stone types and the external physical, chemical and biological agents of deterioration and
• to discuss and exchange views on the terminology associated with deterioration mechanisms

CONTENT OUTLINE
Terminology: structural, architectural and material deterioration systems and their inter-relationships to one another, and to the susceptibilities or vulnerabilities of the stones themselves and their mineralogy. Establishment of symptom and cause:

Structural deformation:
• subsidence and settlement
• eccentric loading, thrusts and failure of support
• failure of cohesion
• thermal movement
• seismic motion

Architectural deterioration:
• moisture ingress
• rising damp
• corroding iron/steel anchors
• inappropriate bedding of stone (eg face bedding of sedimentary stones)
• introduction and entrapment of salts by cementitious mortars
• incompatible adjacent stones
• side-flash lightning impacts
• inappropriate cleaning
SESSION OUTLINE CONT’D

Material deterioration:
• acid rainfall & other pollution effects
• Salt crystallization
• Frost
• Biological deterioration
  - bacteriological impacts
  - algae, lichens and mosses
  - ivy and other creeping plants and higher woody species
  - insects: masonry bees etc
  - bird/bat guano impacts
  - human impacts – graffiti, traffic wear, vandalism and theft
  - animals

READINGS
■ = Essential reading material
■ = Available online


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